

Part-1

BOATS AND STREAMS

Important facts:

- 1) In water, the direction along the stream is called down stream.
- 2) Direction against the stream is called upstream.
- 3) The speed of boat in still water is U km/hr and the speed of stream is V km/hr then

speed down stream $= U + V$ km/hr

speed up stream $= U - V$ km/hr

Formulas:

If the speed down stream is A km/hr and the speed up stream is B km/hr then

speed in still water $= \frac{1}{2}(A+B)$ km/hr

rate of stream $= \frac{1}{2}(A-B)$ km/hr

PROBLEMS: 1. In one hour a boat goes 11 km long the stream

and 5 km against the stream. The speed of the boat in still water is?

Sol:

Speed in still water $= \frac{1}{2} (11+5)$ km/hr
 $= 8$ kmph

2. A man can row 18 kmph in still water. It takes him thrice as long as row up as to row down the river. find the rate of stream.

Sol:

Let man's rate up stream be x kmph
then, in still water $= \frac{1}{2}[3x+x] = 2x$ kmph
so, $2x = 18$, $x = 9$

rate upstream $= 9$ kmph

rate downstream $= 27$ kmph

rate of stream $= \frac{1}{2} [27-9]$
 $= 9$ kmph

3. A man can row $7\frac{1}{2}$ kmph in still water. if in a river running

at 1.5 km an hour, if
takes him 50 min to row to place and back. how far off is the
place?

Sol:

speed down stream = $7.5 + 1.5 = 9$ kmph

speed upstream = $7.5 - 1.5 = 6$ kmph

let the required distance x km. then ,

$$x/9 + x/6 = 50/60 = 2x + 3x = 5/6 * 18$$

$$5x = 15, x = 3$$

Hence, the required distance is 3 km

4. A man can row 3 quarters of a km against the stream in
 $11\frac{1}{4}$ min. the speed of the
man in still water is ?

Sol:

rate upstream = $750/625$ m/sec = $10/9$ m/sec

rate downstream = $750/450$ m/sec = $5/3$ m/sec

rate in still water = $\frac{1}{2}[10/9 + 5/3] = 25/18$ m/sec

$$= 25/18 * 18/5 = 5 \text{ kmph}$$

5. A boat can travel with a speed of 13 kmph in still water. if
the speed of stream is

4 kmph, find the time taken by the boat to go 68 km
downstream?

Sol: Speed down stream = $13 + 4 = 17$ kmph

time taken to travel 68 km downstream = $68/17$ hrs

$$= 4 \text{ hrs}$$

6. A boat takes 90 min less to travel 36 miles downstream
than to travel the same

distance upstream. if the speed of the boat in still water is 10
mph .

the speed of the stream is :

Sol:

Let the speed of the stream be x mph .

then, speed downstream = $[10+x]$ mph

speed upstream = $[10-x]$ mph

$$36/[10+x] - 36/[10-x] = 90/60 = 72x \cdot 60 = 90[100-x^2]$$

$$(x+50)(x-2) = 0$$

$$x = 2 \text{ kmph}$$

7. At his usual rowing rate, Rahul 12 miles down stream in a certain river in 6 hrs

less than it takes him to travel the same distance upstream.

but if he could double

his usual rowing rate for his 24 miles round the down stream

12 miles would then

take only one hour less than the up stream 12 miles. what is

the speed of the

current in miles per hours?

Sol:

Let the speed in still water be x mph and the speed of the current be y mph.

then, speed upstream = $(x-y)$

speed downstream = $(x+y)$

$$12/(x-y) - 12/(x+y) = 6$$

$$6(x^2 - y^2) = 2xy \Rightarrow x^2 - y^2 = 4y \quad (1)$$

$$\text{and } 12/(2x-y) - 12/(2x+y) = 1 \Rightarrow 4x^2 - y^2 = 24y$$

$$x^2 = (24y + y^2)/4 \rightarrow (2)$$

from 1 and 2 we have

$$4y + y^2 = (24y + y^2)/4$$

$$y = 8/3 \text{ mph}$$

$$y = 22/3 \text{ mph}$$

8. There is a road beside a river. Two friends started from a place A, moved to a temple situated at another place B and then returned to A again. One of them moves on a cycle at a speed of 12 kmph, while the other sails on a boat at a speed of 10 kmph. If the river flows at the speed of 4 kmph, which of the two friends will return to place A first?

Sol:

Clearly, The cyclist moves both ways at a speed of 12 kmph

so, average speed of the cyclist = 12 kmph

the boat sailor moves downstream = $(10+4) = 14$ kmph

upstream = $(10-4) = 6$ kmph

So, average speed of the boat sailor = $\frac{2 \times 14 \times 6}{14+6}$ kmph
= $42/5$ kmph = 8.4 kmph

Since, the average speed of the cyclist is greater, he will return to A first.

9. A boat takes 19 hrs for travelling downstream from point A to point B. and

coming back to a point C midway between A and B. If the velocity of the stream is 4 kmph.

and the speed of the boat in still water is 14 kmph. What is the distance between

A and B?

Sol:

speed downstream = $14+4 = 18$ kmph

speed upstream = $14 - 4 = 10$ kmph

let the distance between A and B be x km. then,

$$x/18 + (x/2)/10 = 19$$

$$x/18 + x/20 = 19$$

$$19x/180 = 19 \Rightarrow x = 180 \text{ km}$$

Hence, the distance between A and B is 180 km.

Part-2

BOATS AND STREAMS

IMPORTANT FACTS AND FORMULAE

1. In water, the direction along the stream is called downstream and, the direction against the stream is called upstream.

2. If the speed of a boat in still water is u km/hr and the speed of the stream is v km/hr, then:

speed downstream = (u+v) km/hr.

speed upstream = (u-v) km/hr.

3. If the speed downstream is a km/hr and the speed upstream is b km/hr, then :

speed in still water = $\frac{1}{2}(a+b)$ km/hr

rate of stream = $\frac{1}{2}(a-b)$ km/hr

SOLVED EXAMPLES

EX.1. A man can row upstream at 7 kmph and downstream at 10 kmph. find man's rate in still water and the rate of current.

Sol. Rate in still water = $\frac{1}{2}(10+7)$ km/hr = 8.5 km/hr.

Rate of current = $\frac{1}{2}(10-7)$ km/hr = 1.5 km/hr.

EX.2. A man takes 3 hours 45 minutes to row a boat 15 km downstream of a river and 2 hours 30 minutes to cover a distance of 5 km upstream. find the speed of the river current in km/hr.

Sol. rate downstream = $(15/3 \frac{3}{4})$ km/hr = $(15 \times \frac{4}{15})$ km/hr = 4 km/hr.

Rate upstream = $(5/2 \frac{1}{2})$ km/hr = $(5 \times \frac{2}{5})$ km/hr = 2 km/hr.

Speed of current = $\frac{1}{2}(4-2)$ km/hr = 1 km/hr

EX.3. a man can row 18 kmph in still water. it takes him thrice as long to row up as to row down the river. find the rate of stream.

Sol. Let man's rate upstream be x kmph. then, his rate downstream = 3x kmph.

So, $2x = 18$ or $x = 9$.

Rate upstream = 9 km/hr, rate downstream = 27 km/hr.

Hence, rate of stream = $\frac{1}{2}(27-9)$ km/hr = 9 km/hr.

EX.4. there is a road beside a river. two friends started from a place A, moved to a temple situated at another place B and then returned to A again. one of them moves

on a cycle at a speed of 12 km/hr, while the other sails on a boat at a speed of 10 km/hr. if the river flows at the speed of 4 km/hr, which of the two friends will return

to place A first?

Sol. Clearly the cyclist moves both ways at a speed of 12 km/hr.

The boat sailor moves downstream @ $(10+4)$ i.e., 14 km/hr and upstream @ $(10-4)$ i.e., 6 km/hr.

So, average speed of the boat sailor = $(2 \times 14 \times 6 / 14 + 6)$ km/hr
= $42/5$ km/hr = 8.4 km/hr.

Since the average speed of the cyclist is greater, he will return to A first.

EX.5. A man can row $7\frac{1}{2}$ kmph in still water. If in a river running at 1.5 km/hr an hour, it takes him 50 minutes to row to a place and back, how far off is the place?

Sol. Speed downstream = $(7.5 + 1.5)$ km/hr = 9 km/hr;

Speed upstream = $(7.5 - 1.5)$ kmph = 6 kmph.

Let the required distance be x km. then,

$$x/9 + x/6 = 50/60.$$

$$2x + 3x = (5/6 \times 18)$$

$$5x = 15$$

$$x = 3.$$

Hence, the required distance is 3 km.

EX.6. In a stream running at 2 kmph, a motor boat goes 6 km upstream and back again to the starting point in 33 minutes. Find the speed of the motorboat in still water.

Sol. Let the speed of the motorboat in still water be x kmph. then,

$$6/x + 2 + 6/x - 2 = 33/60$$

$$11x^2 - 240x - 44 = 0$$

$$11x^2 - 242x + 2x - 44 = 0$$

$$(x - 22)(11x + 2) = 0$$

$$x = 22.$$

EX.7. A man can row 40 km upstream and 55 km downstream in 13 hours also, he can row 30 km upstream and 44 km downstream in 10 hours. Find the speed of the man in still water and the speed of the current.

Sol. Let rate upstream = x km/hr and rate downstream = y km/hr.

Then, $40/x + 55/y = 13$... (i) and $30/x + 44/y = 10$

Multiplying (ii) by 4 and (i) by 3 and subtracting, we get: $11/y = 1$ or $y = 11$.

Substituting $y = 11$ in (i), we get: $x = 5$.

Rate in still water = $1/2(11 + 5)$ kmph = 8 kmph.

Rate of current = $1/2(11 - 5)$ kmph = 3 kmph

Part-3

Boats And Streams

1. A boat can travel with a speed of 13 km/hr in still water. If the speed of the stream is 4 km/hr, find the time taken by the boat to go 68 km downstream.

A. 2 hours B. 3 hours

C. 4 hours D. 5 hours

Answer & Explanation

Answer: Option C

Explanation:

Speed downstream = $(13 + 4)$ km/hr = 17 km/hr.

Time taken to travel 68 km downstream =
68

17 hrs = 4 hrs.

2. A man's speed with the current is 15 km/hr and the speed of the current is 2.5 km/hr. The man's speed against the current is:

- A. 8.5 km/hr B. 9 km/hr
C. 10 km/hr D. 12.5 km/hr

Answer & Explanation

Answer: Option C

Explanation:

Man's rate in still water = $(15 - 2.5)$ km/hr = 12.5 km/hr.

Man's rate against the current = $(12.5 - 2.5)$ km/hr = 10 km/hr.

3. A boat running upstream takes 8 hours 48 minutes to cover a certain distance, while it takes 4 hours to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current respectively?

- A. 2 : 1 B. 3 : 2
C. 8 : 3 D. Cannot be determined
E. None of these

Answer & Explanation

Answer: Option C

Explanation:

Let the man's rate upstream be x kmph and that downstream be y kmph.

Then, distance covered upstream in 8 hrs 48 min = Distance covered downstream in 4 hrs.

$$x \times 8$$

$$4$$

$$5 = (y \times 4)$$

$$44 \quad x = 4$$

$$5 \quad y$$

$$y =$$

$$11$$

$$x.$$

$$5$$

Required ratio =

$$y +$$

$$x :$$

$$y -$$

$$x$$

$$2 \quad 2$$

$$=$$

$$16$$

$$x \times 1 :$$

$$6$$

$$x \times 1$$

$$5 \quad 2 \quad 5 \quad 2$$

$$=$$

$$8$$

$$:$$

$$3$$

$$5 \quad 5$$

$$= 8 : 3.$$

4. A motorboat, whose speed in 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. The speed of the stream (in km/hr) is:

- A. 4 B. 5
C. 6 D. 10

Answer & Explanation

Answer: Option B

Explanation:

Let the speed of the stream be x km/hr. Then,

Speed downstream = $(15 + x)$ km/hr,

Speed upstream = $(15 - x)$ km/hr.

30

+

30

= 4

1

$(15 + x)(15 - x) = 2$

900

=

9

$225 - x^2 = 2$

$9x^2 = 225$

$x^2 = 25$

$x = 5$ km/hr.

5. In one hour, a boat goes 11 km/hr along the stream and 5 km/hr against the stream. The speed of the boat in still water (in km/hr) is:

A. 3 km/hr B. 5 km/hr

C. 8 km/hr D. 9 km/hr

Answer & Explanation

Answer: Option C

Explanation:

Speed in still water =

1

$(11 + 5) \text{ kmph} = 8 \text{ kmph.}$

2

6. A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?

A. 4 km/hr B. 6 km/hr

C. 8 km/hr D. Data inadequate

Answer & Explanation

Answer: Option B

Explanation:

Rate downstream =

16

$2 \text{ kmph} = 8 \text{ kmph.}$

Rate upstream =

16

$4 \text{ kmph} = 4 \text{ kmph.}$

Speed in still water =

1

$(8 + 4) \text{ kmph} = 6 \text{ kmph.}$

2

7. The speed of a boat in still water is 15 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is:

A. 1.2 km B. 1.8 km

C. 2.4 km D. 3.6 km

Answer & Explanation

Answer: Option D

Explanation:

Speed downstream = $(15 + 3) \text{ kmph} = 18 \text{ kmph.}$

Distance travelled = $18 \times$

12

$60 \text{ km} = 3.6 \text{ km.}$

8. A boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph, the speed of the stream is:

A. 2 mph B. 2.5 mph

C. 3 mph D. 4 mph

Answer & Explanation

Answer: Option A

Explanation:

Let the speed of the stream x mph. Then,

Speed downstream = $(10 + x)$ mph,

Speed upstream = $(10 - x)$ mph.

36

-

36

=

90

$(10 - x)(10 + x) 60$

$72x \times 60 = 90(100 - x^2)$

$x^2 + 48x - 100 = 0$

$(x + 50)(x - 2) = 0$

$x = 2$ mph.

9. A man can row at 5 kmph in still water. If the velocity of current is 1 kmph and it takes him 1 hour to row to a place and come back, how far is the place?

A. 2.4 km B. 2.5 km

C. 3 km D. 3.6 km

Answer & Explanation

Answer: Option A

Explanation:

Speed downstream = $(5 + 1)$ kmph = 6 kmph.

Speed upstream = $(5 - 1)$ kmph = 4 kmph.

Let the required distance be x km.

Then,

x

+

x

= 1

6 4

$2x + 3x = 12$

$5x = 12$

$x = 2.4$ km.

10.

A boat covers a certain distance downstream in 1 hour, while it comes back in 1 hours. If the speed of the stream be 3 kmph, what is the speed of the boat in still water?

A. 12 kmph B. 13 kmph

C. 14 kmph D. 15 kmph

E. None of these

Answer & Explanation

Answer: Option D

Explanation:

Let the speed of the boat in still water be x kmph. Then,

Speed downstream = $(x + 3)$ kmph,

Speed upstream = $(x - 3)$ kmph.

$(x + 3) \times 1 = (x - 3) \times$

3

2

$2x + 6 = 3x - 9$

$x = 15$ kmph.

11. A boatman goes 2 km against the current of the stream in 1 hour and goes 1 km along the current in 10 minutes. How long will it take to go 5 km in stationary water?

A. 40 minutes B. 1 hour

C. 1 hr 15 min D. 1 hr 30 min

Answer & Explanation

Answer: Option C

Explanation:

Rate downstream =

1

$\times 60$
 $10 \text{ km/hr} = 6 \text{ km/hr.}$
 Rate upstream = 2 km/hr.
 Speed in still water =

$\frac{1}{(6 + 2) \text{ km/hr} = 4 \text{ km/hr.}}$
 $\frac{2}{1}$

Required time =
 $\frac{5}{\text{hrs} = 1}$

$\frac{1}{4 \text{ hrs} = 1 \text{ hr } 15 \text{ min.}}$
 $\frac{12.}{12.}$

A man can row three-quarters of a kilometre against the stream in 11 minutes and down the stream in 7 minutes. The speed (in km/hr) of the man in still water is:

A. 2 B. 3

C. 4 D. 5

Answer & Explanation

Answer: Option D

Explanation:

We can write three-quarters of a kilometre as 750 metres,
 and 11 minutes as 675 seconds.

Rate upstream =

$\frac{750}{\text{m/sec}}$
 $=$

$\frac{10}{675 \text{ m/sec.}}$
 Rate downstream =

$\frac{750}{\text{m/sec}}$
 $=$

$\frac{5}{450 \text{ m/sec.}}$
 Rate in still water =

$\frac{1}{10}$
 $+$

$\frac{5}{2 \text{ } 9 \text{ } 3 \text{ m/sec}}$
 $=$

$\frac{25}{\text{m/sec}}$
 $\frac{18}{= 25 \times 18}$

$\frac{18}{5}$
 $\frac{18 \text{ } 5}{\text{km/hr}}$

$\frac{1}{= 5 \text{ km/hr.}}$
 13. Speed of a boat in standing water is 9 kmph and the speed of the stream is 1.5 kmph. A

man rows to a place at a distance of 105 km and comes back to the starting point. The
 total time taken by him is:

A. 16 hours B. 18 hours

C. 20 hours D. 24 hours

Answer & Explanation

Answer: Option D

Explanation:

Speed upstream = 7.5 kmph.

Speed downstream = 10.5 kmph.

Total time taken =

105

+
105

7.5 10.5 hours = 24 hours.

14. A man takes twice as long to row a distance against the stream as to row the same distance in favour of the stream. The ratio of the speed of the boat (in still water) and the stream is:

A. 2 : 1 B. 3 : 1

C. 3 : 2 D. 4 : 3

Answer & Explanation

Answer: Option B

Explanation:

Let man's rate upstream be x kmph.

Then, his rate downstream = $2x$ kmph.

(Speed in still water) : (Speed of stream) =

$2x +$

$x :$

$2x -$

x

$2 2$

$=$

3

$x : x$

$2 2$

$= 3 : 1.$

15. A man rows to a place 48 km distant and come back in 14 hours. He finds that he can row 4 km with the stream in the same time as 3 km against the stream. The rate of the stream is:

A. 1 km/hr B. 1.5 km/hr

C. 2 km/hr D. 2.5 km/hr

Answer & Explanation

Answer: Option A

Explanation:

Suppose he move 4 km downstream in x hours. Then,

Speed downstream =

4

x km/hr.

Speed upstream =

3

x km/hr.

48

$+$

48

$= 14$ or $x =$

1

$.$

$(4/x) (3/x) 2$

So, Speed downstream = 8 km/hr, Speed upstream = 6 km/hr.

Rate of the stream =

1

$(8 - 6) \text{ km/hr} = 1 \text{ km/hr}.$

2

Part-4

Problems on boats and streams

1. If a man can swim downstream at 6kmph and upstream at 2km ph his

speed in still water is : **ans :4 km/hr**

Basic Formula:

If the speed downstream is a km/ hr and the speed upstream is 6 km/ hr

then Speed in still water is = $\frac{1}{2} (a+b)$ km / hr

Answer with Explanation:

Given : speed downstream a = 6 km ph

Speed upstream b = 2kmph

Speed in still water = $\frac{1}{2} (a+b)$ kmph

= $\frac{1}{2} (6+2)$

= $\frac{8}{2} = 4$ kmph

speed in still water = 4kmph

2. A man can row upstream at 8kmph and downstream at 12kmph the speed of the stream is **Ans:2.5km/hr**

Basic Formula:

If the speed downstream is a kmph and the speed upstream is 6 kmph then

Speed of the stream = $\frac{1}{2} (a-b)$ kmph

Answer with Explanation:

Speed downstream a = 12kmph

Speed upstream b = 8 kmph

Speed of the stream = $\frac{1}{2} (a-b) = \frac{1}{2} (12-8)$

= $\frac{4}{2} = 2$ kmph

speed of the stream = 2kmph

3. If anshul rows 15km upstream and 21km downstream taking 3 hours each time, then the speed of the stream is **Ans:1km/hr**

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ where

a= speed downstream

b= speed upstream

Answer with Explanation:

Speed downstream = distance travelled / time taken = $\frac{21}{3}$

a = 7km / hr

speed upstream = $\frac{15}{3} = 5$

b = 5km/hr

speed of the stream = $\frac{1}{2} (a-b)$ km/hr

= $\frac{1}{2} (7-5)$

= 1 km/hr

speed of the stream = 1km/ hr

4. A man rows 750m in 675 seconds against the stream and returns in 7

$\frac{1}{2}$ minutes. How rowing speed in still water is **Ans: 5km/hr**

Basic Formula:

i) Speed in still water = $\frac{1}{2} (a+b)$ kmph where 'a' is speed downstream and 'b' is speed upstream

ii) $a \text{ km / hr} = a \times \frac{5}{18} \text{ m / s}$

iii) $a \text{ m/sec} = a \times \frac{18}{5} \text{ km/hr}$

Answer with Explanation:

Speed upstream 'b' = $750 \text{ m} / 675 \text{ sec} = 30/31 \text{ m/sec}$

Speed downstream 'a' = $700 / 7 \frac{1}{2} \text{ m / minutes}$

$a = 750 / 450 \text{ m / sec} = 5/3 \text{ m/sec}$

speed in still water = $\frac{1}{2} (a+b)$

$= \frac{1}{2} (750/450 + 750/675) \text{ m /sec}$

$= \frac{1}{2} (750/450 + 750/675) \times \frac{18}{5} \text{ km/hr}$

$= \frac{1}{2} (5/3 + 30/31) \times \frac{18}{5} \text{ km/hr}$

$= 4.7 \text{ km/hr}$

5. A man rows 13km upstream in 5 hours and also 28km downstream in 5 hours. The velocity of the stream is **Ans: 1.5 km/hr**

Basic Formula:

Velocity of the stream = $\frac{1}{2} (a-b) \text{ km/hr}$

Answer with Explanation:

Speed upstream 'b' = $13 \text{ km} / 5 \text{ hr}$

Speed downstream 'a' = $28/5 \text{ km/hr}$

Velocity of the stream = $\frac{1}{2} (a-b)$

$= \frac{1}{2} (28/5 - 13/5)$

$= \frac{1}{2} (15/5)$

$= 3/2$

velocity of the stream = 1.5 km/hr

6. If a boat goes 7km upstream in 42 minutes and the speed of the stream is 3kmph, then the speed of the boat in still water is **Ans: 13km/hr**

Basic Formula:

i. speed of the stream = $\frac{1}{2} (a-b) \text{ km/hr}$

ii. speed of the boat in still water = $\frac{1}{2} (a+b) \text{ km/hr}$

Answer with Explanation:

Speed upstream = $7/42 \text{ km/min} = 7/42 \times 60 \text{ km/hr}$

i.e, $b=10 \text{ km/hr}$

speed of the stream = 3 km/hr

$\frac{1}{2} (a-b) = 3$

$\frac{1}{2} (a-10) = 3 \cdot a-10=6 \cdot a=16 \text{ km/hr}$

speed of the boat in still water

$$= \frac{1}{2} (a+b)$$

$$= \frac{1}{2} (16+10)$$

$$= 26/2 = 13 \text{ km/hr}$$

7. A man can row $9 \frac{1}{3}$ kmph in still water and finds that it takes him thrice as much time to row up than as to row down the same distance in the river. The speed of the current is **ans: $4 \frac{2}{3}$ km/hr**

Basic Formula:

$$\text{Speed of current} = \frac{1}{2} (a-b) \text{ km/hr}$$

Answer with Explanation:

Let man's rate upstream be x km/hr. Then his rate downstream is $3x$ km/hr

Given:

$$\text{Speed in still water} = 9 \frac{1}{3} = \frac{28}{3} \text{ km/hr}$$

$$\text{i.e., } \frac{1}{2} (a+b) = \frac{28}{3} \text{ km/hr}$$

$$\begin{aligned} \cdot \quad \frac{1}{2} (x+3x) &= \frac{28}{3} \\ \cdot \quad 2x &= \frac{28}{3} \cdot \quad x = \frac{28}{2 \times 3} = \frac{14}{3} \text{ km/hr} \end{aligned}$$

rate upstream $b = \frac{14}{3}$ km/hr and

rate downstream $a = \frac{14}{3} \times 3 = 14$ km/hr

$$\text{speed of the current} = \frac{1}{2} (a-b) = \frac{1}{2} (14 - \frac{14}{3})$$

$$= \frac{1}{2} (42 - \frac{14}{3}) = \frac{28}{6} = 4 \frac{2}{3} \text{ km/hr}$$

8. A man can row a boat at 10 kmph in still water. IF the speed of the stream is 6 kmph, the time taken to row a distance of 80 km down the stream

is **ans: 5 hours**

Basic Formula:

$$\text{Speed of stream} = \frac{1}{2} (a-b) \text{ km/hr}$$

$$\text{Speed in still water} = \frac{1}{2} (a+b) \text{ km/hr}$$

Answer with Explanation:

Given:

$$\text{Speed in still water, } \frac{1}{2} (a+b) = 10 \text{ km/hr}$$

$$\cdot \quad a+b = 20 \text{ km/hr} \quad \text{== (1)}$$

$$\text{speed of the stream, } \frac{1}{2} (a-b) = 6 \text{ km/hr}$$

$$\cdot \quad a-b = 12 \text{ km/hr} \quad \text{== (2)}$$

$$1+2 \cdot \quad 2a = 32$$

$$a = 16 \text{ km/hr}$$

speed downstream = distance traveled / time taken

$$\text{time taken} = 80/16 = 5 \text{ hours}$$

9. A boat takes 4 hours for traveling downstream from point A to point B and coming back to point A upstream. If the velocity of the stream is 2 km/hr and the speed of the boat in still water is 4 km/hr, what is the distance between A and B? **Ans: 6 km**

Basic Formula:

Speed of stream = $\frac{1}{2} (a-b)$ km/hr

Speed of still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Given:

Time taken by boat to travel upstream and downstream = 4 hours

Velocity of the stream, $\frac{1}{2} (a-b) = 2$ km/hr

$$a-b = 4 \text{ km/hr} \cdot 1$$

$$\text{velocity of the boat in still water} = \frac{1}{2} (a+b) = 4 \text{ km/hr}$$

$$a+b = 8 \text{ km/hr} \cdot 2$$

solving 1 x 2 we get $a = 6$ km/hr $b = 2$ km/hr

let the distance between A and B be x km

$$\frac{x}{2} + \frac{x}{6} = 4 \cdot 3x + x = 24 \cdot 4x = 24 \rightarrow x = 6$$

distance between A and B = 6 km

10. If a man rows at 6 km/hr in still water and 4.5 km/hr against the current, then his rate along the current is : **Ans: 7.5 km/hr**

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ km/hr

Speed in the still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the rate along the current i.e., speed upstream be x km/hr

Speed downstream a

be x km/hr

$$a = 4.5 \text{ km/hr}$$

$$\Rightarrow \frac{1}{2} (a+b) = 6$$

$$\cdot \frac{1}{2} (4.5 + x) = 6$$

$$\cdot 4.5 + x = 12$$

$$\cdot x = 12 - 4.5 = 7.5$$

speed along the current = 7.5 km/hr

11. If a man's rate with the current is 11 km/hr and the rate of the current is 1.5 km/hr, then the man's rate against the current is **Ans: 8 km/hr**

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ km/hr

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Given:

Rate downstream a = 11km/hr

Rate of current = $\frac{1}{2} (a-b) = 1.5$ km/hr

= a-b = 3km/hr

= 11-b = 3

= b= 8km/hr

rate against the current upstream = 8km/hr

12. Speed of a boat in standing water is 9kmph and the speed of the stream is 1:5kmph. A man rows to a place at a distance of 10.5 km and comes back to the starting point. The total time taken by him is **ans: 24 hours**

Basic Formula:

i. speed = distance traveled / time taken

ii. speed of the stream = $\frac{1}{2} (a-b)$ km/hr

iii. speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Speed in still water= $\frac{1}{2} (a+b) = 9$ km ph

= a+b = 18 --1

speed of the stream = $\frac{1}{2} (a-b) = 1.5$ kmph

= a-b = 3 kmph --2

solving 1 and 2 gives a = 10.5km/hr ; b=7.5 kmphr

Total time taken by him = $105/10.5 + 105/7.5 = 24$ hours

13. Aboat moves upstream at the rate of 1km in 10 minutes and downstream at the rate of 1km in 6 minutes. The speed of the current is **ans:2km/hr**

Basic Formula:

Speed of the current = $\frac{1}{2} (a-b)$ km/hr

Answer with Explanation:

Speed upstream 'b' = $1/10 \times 60$ km/hr

= 6 km/hr

speed downstream 'a' = $1/6$ km/ min = $1/6 \times 60$

= 10km/hr

speed of the current = $\frac{1}{2} (a-b)$

= $\frac{1}{2} (10-6)$

= 2 km / hr

14. River is running at 2kmphr. IF takes a man twice as long to row up as to row down the river. The rate of the man in still water is **ans:6km/hr**

Basic Formula:

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the man's rate upstream 'b' = x kmph.

Then his rate downstream 'a' = 2x kmph

Speed of the stream = 2 km/hr

$$= \frac{1}{2} (a-b) = 2$$

$$= a-b = 4$$

$$\cdot 2x - x = 4 \cdot x=4$$

$$a=8 ; b = 4$$

speed in still water = $\frac{1}{2} (8+4) = 6$ km/hr

15. A man rows to a place 48km distant and back in 14 hours. He finds that he can row 4km with the stream in the same time as 3km against the stream. The rate of the stream is :**ans:1km/hr**

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ km / hr

Speed = distance traveled / time taken

Answer with Explanation:

Suppose he moves 4km downstream in x hours

Then, downstream a= 4 / x km/hr

Speed upstream b = 3/ x km/hr

$$48 / 4 / x + 48 / 3/x = 14$$

$$x/4 + x/3 = 14/48 = \frac{1}{4}$$

$$3x + 4x / 12 = \frac{1}{4} \cdot 7x \times 4 = 12 \cdot x = 3/7$$

$$a=28/3 \text{ km/hr } b = 7\text{km/hr}$$

$$\text{rate of stream} = \frac{1}{2} (28/3 - 7)$$

$$= 7/6 = 1.1 \text{ km/hr}$$

16. The current of stream runs at 1kmph. A motor baot goes 35km upstream and back again to the starting point in 12hours. The speed of the motor boat in still water is **ans:6km/hr**

Basic Formula:

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the speed of the motor boat in still water be x kmph then.

Speed downstream = x+1 km/hr

Speed upstream = x-1 km/hr

$$35/x+1 + 35/x-1 = 12$$

$$x-1+x+1/ (x+1) (x-1) = 12/35 == > 2x / x_2 - 1 = 12/35$$

$$= 6x_2 - 35 x - 6 = 0$$

$$= 6x^2 - 36x + x - 6 = 0$$

$$= 6x(x-6) + 1(x-6) = 0 \cdot (6x+1)(x-6) = 0$$

$$\cdot x=6 \text{ km/hr}$$

17. A boat covers 24km upstream and 36km downstream in 6 hours while it cover 35km upstream and 24km downstream in $6\frac{1}{2}$ hours. The velocity of

the current is **ans:2km/hr**

Basic Formula:

Speed of the stream = $\frac{1}{2}(a-b)$ km/hr

Answer with Explanation:

Let the rate upstream = x km / hr and

Rate downstream = y km/hr

$$24/x + 36/y = 6 \cdot 36x + 24y = 6xy \cdot 1$$

$$36/x + 24/y = 6\frac{1}{2} \cdot 24x + 36y = 13/2 xy \cdot 2$$

letting $1/x = a$, $1/y = B$

$$1+2 \cdot 60(1/x + 1/y) = 25/2 \cdot 1/x + 1/y = 5/24 \cdot 3$$

$$2-1 \cdot 12(1/x - 1/y) = \frac{1}{2} \cdot 1/x - 1/y = 1/24 \cdot 4$$

$$3+4 \cdot x = 8 \text{ solving we get } y=12$$

$$\text{speed of stream} = \frac{1}{2}(12-8) = 2\text{km/hr}$$

18. A man can row three quarters of a kilometer against the stream in $11\frac{1}{4}$ minutes and returns in $7\frac{1}{4}$ mintues. The speed of the man is still water is

ans:5km/hr

Basic Formula:

Answer with Explanation:

19. The speed of a boat in still water is 15km/hr and the rate of current is 3 km/hr. the distance traveled downstream in 12 minutes is **ans:3.6km**

Basic Formula:

Distance traveled downstream = speed downstream x time

Answer with Explanation:

Speed in still water = 15km/hr

$$\frac{1}{2}(a+b) = 15\text{km/hr}$$

$$a+b = 30 \text{ km/hr -- (1)}$$

speed of current = 3 km/hr

$$\frac{1}{2}(a-b) = 3\text{km/hr}$$

$$a-b= 6 \text{ km/hr --2}$$

$$1+2 \cdot 2a = 36 \cdot a = 18 \text{ km/hr}$$

ie., speed downstream = 18 km/hr

$$\text{distance traveled downstream} = 18 \times 12/60 \text{ km} = 3.6 \text{ km}$$

20. A man can row 5kmph in still water. If the river is running at 1kmph, it makes him 75minutes to row to a place and back. How far is the place?

Ans:3km

Basic Formula:

$$\text{Speed of the stream} = \frac{1}{2} (a-b) \text{ km/hr}$$

$$\text{Speed of the boat in still water} = \frac{1}{2} (a+b) \text{ km/hr}$$

Answer with Explanation:

$$\text{Speed in still water , } \frac{1}{2} (a+b) = 5 \implies a+b = 10 \text{ -- (1)}$$

$$\text{Speed of the stream , } \frac{1}{2} (a-b) = 1 \cdot a-b = 2 \text{ --(2)}$$

Solving 1 and 2 gives a=6 ; b=4

Let the required distance be x km

$$x/6 + x/4 = 75/60 \implies 10x/24 = 75/60$$

$$x = 24 \times 75/10 \times 60 = 3$$

required distance = 3 km

21. If a man rows at the rate of 5kmph in still water and his rate against the current is 3.5kmph then the man's rate along the current is **ans:**

6.5km/hr

Basic Formula:

$$\text{Speed in still water} = \frac{1}{2} (a+b) \text{ km/hr}$$

Answer with Explanation:

$$\text{Speed in still water , } \frac{1}{2} (a+b) = 5 \text{ km/hr} \cdot a+b = 10$$

$$\text{Speed upstream } b = 3.5 \text{ km/hr}$$

$$\text{Speed along the current i.e, downstream } a = 10-3.5 = 6.5 \text{ km/hr}$$

22. There is road besides a river. Two friends started from a place A, moved to a temple

situated at another place B and then returned to A again. One of them moves on a cycle at

a speed of 12 km/hr, while the other sails on a boat at a speed of 10 km/hr. If the river flows at the speed of 4 km/hr, which of the two friends will return to place A?

a. Both b. Boater c. **Cyclist** d. None of these

Basic Formula:

Answer with Explanation:

The cyclist moves both ways at a speed of 12km/hr so average speed for the

cyclist – 12 km/hr

Also boat moves downstream at $10+4 = 14\text{km/hr}$ and upstream $10-4 = 6\text{km/hr}$

$4 = 6\text{km/hr}$

Average speed of the boat sailor = $2 \times 14 \times 6 / 14 + 6 = 42/5 = 8.4\text{km/hr}$

The average speed of cyclist is greater cyclist comes first and return to place A

23. A man can row 2

7 1 km/hr in still water. If in a river running at 1.5 km/hr, it takes

him 50 minutes to row to a place and back, how far off is the place?

a. 4 km b. 3 km c. 5 km d. 4.5 km

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ km/hr

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Speed in still water, $\frac{1}{2} (a+b) = 7 \frac{1}{2} \text{ km/hr} \Rightarrow a+b = 15 \text{ --(1)}$

Speed of the stream, $\frac{1}{2} (a-b) = 1.5 \text{ km/hr} \Rightarrow a-b = 3 \text{ km/hr}$

$a-b=3\text{km/hr}$

$1+2 \Rightarrow a=9 ; b = 6$

let the required distance be x km

$\frac{x}{9} + \frac{x}{6} = \frac{50}{60}$

$\frac{15x}{9 \times 6} - \frac{5}{60} \Rightarrow x = \frac{9 \times 6 \times 50}{15 \times 60} = 3\text{km}$

required distance = 3km

24. In one hour, a boat goes 11 km along the stream and 5 km against the stream. The speed of the boat in still water (in km/hr) is:

a. 3 b. 5 c. 8 d. 9

Basic Formula:

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Speed downstream a= 11/1 km/hr

Speed upstream b= 5/1 km/hr

Speed in still water = $\frac{1}{2} (a+b) = \frac{1}{2} (11+5) = 8\text{km/hr}$

25. A boat running downstream covers a distance of 16 km in 2 hours while for covering

the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?

a. 4 km/hr b. 6 km/hr c. 8 km/hr d. Data

inadequate

Basic Formula:

Speed of boat in still water = $\frac{1}{2} (a+b)$ km

Answer with Explanation:

Speed downstream 'a' = $16/2 = 8\text{ km/hr}$

Speed upstream 'b' = $16/4 = 4\text{ km/hr}$

Speed in still water = $\frac{1}{2} (a+b) = \frac{1}{2} (8+4) = 6\text{ km/hr}$

26. A man row three-quarters of a kilometer against the stream in 4 111 minutes. The speed (in km/hr) of the man in still water is:

a. 4 b. 2 c. 3 d. 5

Basic Formula:

Rate in still water = $\frac{1}{2} (a+b)\text{ km/hr}$

ii) a m/sec = a x 18/5 km/hr

Answer with Explanation:

Rate upstream = $750 / 675 \text{ m/sec} = 10/9 \text{ m/sec}$

Rate downstream = $750/450 \text{ m/sec} = 5/3 \text{ m/sec}$

Rate in still water = $\frac{1}{2} (10/9 + 5/3)$

= $25/18 \text{ m/sec}$

= $25 / 18 \times 18/5 \text{ km/hr}$

rate in still water = 5 km/hr

27. A boat running upstream takes 8 hours 48 minutes to cover a certain distance, while it

takes 4 hours to cover the same distance running downstream. What is the ratio between

the speed of the boat and speed of the water current respectively?

a. 2 : 1 b. 3 : 2 c. 8 : 3 d. None of these

Basic Formula:

Speed of boat = $\frac{1}{2} (a+b) \text{ km/hr}$

Speed of stream = $\frac{1}{2} (a-b) \text{ km/hr}$

Answer with Explanation:

Let the speed upstream be x km/hr and speed downstream be y km/hr.

Then

Distance covered upstream

in 8 hours 48 minutes = distance covered downstream in 4 hours

$x \times 48 / 60 \times 8 = y \times 4 \cdot 44x / 5 = 4y \cdot y = 11/5 x$

ratio between the speed of the boat and speed of the water current

$\frac{1}{2} (x+y) = \frac{1}{2} (y-x)$

$\frac{1}{2} (x+11x / 5) = \frac{1}{2} (-x + 11x/5) \cdot 8/5 : 3/5 = 8:3$

28. A boat can travel with a speed of 13 km/hr in still water. If the speed of the stream is 4 km/hr, find the time taken by the boat to go 68 km downstream.

a. 4 hours b. 3 hours c. 5 hours d. 2 hours

Basic Formula:

Speed upstream = speed in still water – speed of stream

Speed downstream = speed in still water + speed of stream

Answer with Explanation:

Speed in still water = 13 km/hr

Speed of the stream = 4 km/hr

Speed upstream = $13 - 4 = 9$ km/hr

Speed downstream = $13 + 4 = 19$ km/hr

Time taken by the boat to go 68 km downstream = $68 / 19 = 4$ hours

29. The speed of a boat in still water is 15 km/hr and the rate of current is 3 km/hr. The distance traveled downstream in 12 minutes is:

a. 1.2 km b. 1.8 km c. 2.4 km d. 3.6 km

Basic Formula:

Answer with Explanation:

30. A man can row at 5 km/hr in still water. If the velocity of current is 1 km/hr and it takes him 1 hour to row to a place and come back, how far is the place?

a. 2.4 km b. 2.5 km c. 3 km d. 3.6 km

Basic Formula:

Distance traveled = speed x time

Answer with Explanation:

Speed in still water = 5 km/hr

Speed of the stream = 1 km/hr

Speed upstream = $5 - 1 = 4$ km/hr

Speed downstream = $5 + 1 = 6$ km/hr

Let the required distance be x km

$$\frac{x}{4} + \frac{x}{6} = 1$$

$$6x + 4x / 24 = 1$$

$$10x = 24 \implies x = 24/10 = 2.4$$

required distance = 2.4 km

31. A man can row 3

9 1 km/hr in still water and finds that it takes him thrice as much

time to row up than as to row down the same distance in the river. The speed of the current is:

a.

3

3 1 km/hr b.

9

3 1 km/hr c.

3

4 2 km/hr d.

2

4 1 km/hr

Basic Formula:

Speed of the current = $\frac{1}{2} (a-b)$ km/hr

Answer with Explanation:

Speed in still water = $9 \frac{1}{3}$ km/hr

Let man's rate upstream = x km/hr

Man's rate downstream = $3x$ km/hr

Speed in still water = $\frac{1}{2} (a+b) = 9 \frac{1}{3} = \frac{28}{3}$

$= \frac{1}{2} (x+3x) = \frac{28}{3}$

$= 2x = \frac{28}{3} \implies x = \frac{14}{3}$

speed upstream $b = \frac{14}{3}$ speed downstream $a = 14$

speed of current = $\frac{1}{2} (a-b) = \frac{1}{2} (14 - \frac{14}{3}) = \frac{14}{3} = 4 \frac{2}{3}$ km/hr

32. A boat covers a certain distance downstream in 1 hour, while it comes back in 2 11

hours. If the speed of the stream be 3 km/hr, what is the speed of the boat in still water?

a. 12 km/hr b. 13 km/hr c. 14 km/hr **d. 15 km/hr**

Basic Formula:

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the speed of the boat in still water be x kmph

Speed upstream = $x-3$ km/hr

Speed downstream = $x+3$ km/hr

$(x+3)1 = (x-3) 1 \frac{1}{2}$

$2x + 3 = 3x - 9$

$x = 15$ km/hr

speed of the boat in still water is 15km/hr

33. A motorboat, whose speed is 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. The speed of the stream (in km/hr) is:

a. 4 **b. 5** c. 6 d. 10

Basic Formula:

Speed in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the speed of the boat in still water be x kmph

speed in still water = 15km/hr

speed upstream = $15-x$ km/hr

speed downstream = $15+x$ km/hr

$= 30 / 15+x + 30 / 15-x = 4 \frac{1}{2}$

$$\begin{aligned}
 &= 30(15-x) + 30(15+x) / 152 - x_2 = 9/2 \\
 &= 900/152 - x_2 = 9/2 \\
 &= 152 - x_2 = 900 \times 2/9 = 200 \\
 &= x_2 = 225 - 200 = 25 \\
 &= x = 5
 \end{aligned}$$

speed of the stream = 5km/hr

34. A boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 m/hr, the speed of the stream is:

a. **2 m/hr** b. 2.5 m/hr c. 3 m/hr d. 4 m/hr

Basic Formula:

Speed = distance traveled / time taken

Answer with Explanation:

Let the speed of the stream be x m/hr

Then speed downstream = 10+x m/hr

Speed upstream = 10-x m/hr

$$= 36/10+x + 36/10-x = 90/60$$

$$= 36/10+x + 36/10-x = 90/60$$

$$= 36(10-x) + 36(10+x) = 90/60 (102-x_2)$$

$$= x_2 + 48x + 100 = 0$$

$$= x+50)(x-2) = 0$$

$$= x = 2$$

speed of the stream is 2km/hr

35. A boat covers 24 km upstream and 36 km downstream in 6 hours while it covers 36 km upstream and 24 km downstream in

2

6 1 hours. The velocity of the current is:

a. 1 km/hr b. 1.5 km/hr **c. 2 km/hr** d. 2.5 km/hr

Basic Formula:

Answer with Explanation:

36. At this usual rowing rate, Rahul can travel 12 miles downstream in a certain river in 6

hours less than it takes him to travel the same distance upstream. But if he could double his usual rowing rate for his 24 miles round trip, the downstream 12 miles would then take only one hour less than the upstream 12 miles. What is the speed of the current in miles per hour?

a.

3

11 b.

3

1 2 c.

3

2 1 d.

3

2 2

Basic Formula:

Speed of the current = $\frac{1}{2} (a-b)$ km/hr

Answer with Explanation:

Let the speed in still water be x m/hr

Speed of stream be y m/hr

Then, speed upstream = $x-y$ m/hr and

Speed downstream = $x+y$ m/hr

$$12/x-y - 12/x+y = 6 \implies 6(x^2 - y^2) = 24y$$

$$\cdot \quad x^2 - y^2 = 4y \quad \cdot \quad x^2 = y^2 + 4y^2 \quad \cdot \quad 1$$

also

$$12/2x-y - 12/2x+y = 1 \quad \cdot \quad 4x^2 - y^2 = 24y$$

$$x^2 = 24y + y^2/4 \quad \cdot \quad 2$$

$$\cdot \quad 16y + 4y^2 = 24y + y^2$$

$$3y^2 = 8y \quad \cdot \quad y = 8/3$$

speed of the current = $8/3$ m/hr = $2 \frac{2}{3}$ m/hr

37. What is the speed of the boat in still water?

I. It takes 2 hours to cover the distance between A and B downstream.

II. It takes 4 hours to cover the distance between A and B upstream.

a. Only I is sufficient b. Only II is sufficient

c. Both I & II are necessary to answer the question

d. Either I and II alone are sufficient.

Basic Formula:

Speed of the boat in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Both speed upstream and speed downstream are needed. So answer is (c)

38. What is the speed of the boat in still water?

I. The boat covers a distance of 48 kms in 6 hours while running upstream.

II. The boat covers the same distance in 4 hours while running downstream.

a. Only I is sufficient b. Only II is sufficient

c. Both I & II are necessary to answer the question

d. Either I and II alone are sufficient.

Basic Formula:

Speed of the boat in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Both speed upstream and speed downstream are necessary so answer is (c)

39. A boat takes a total time of three hours to travel downstream from P to Q and upstream back from Q to P. What is the speed of the boat in still water?

I. The speed of the river current is 1 km/hr.

II. The distance between P and Q is 4 km.

a. Only I is sufficient b. Only II is sufficient

c. Both I & II are necessary to answer the question

d. Either I and II alone are sufficient.

Basic Formula:

Answer with Explanation:

Both I and II are necessary to answer the question

40. What is the speed of stream?

I. The boat covers 24 km in 6 hours moving upstream.

II. The boat covers 24 km in 3 hours moving downstream.

III. The ratio between the speed of boat and stream is 3 : 1 respectively.

a. Any two of three b. I and II only c. II and III only

d. I and III only e. All I, II and III

Basic Formula:

Answer with Explanation:

Any two of the condition is enough to find the speed of stream

Answer is a) any two of three

41. A boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph,

the speed of the stream is :

Answer : 2

Basic Formula:

Answer with Explanation:

42. The rate of stream is 4 kmph. A boat goes 6 kms and back to the starting point in 2 hrs. The speed of the boat in still water?

Answer : 8 kmph

Basic Formula:

Speed of the boat in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Let the speed in still water = x km/hr

Speed of the stream = 4 km/hr

Speed upstream = x - 4 km/hr

Speed downstream = x + 4 km/hr

$$\begin{aligned}
6 / x - 4 + 6 / x + 4 &= 2 \\
6(x+4 + x - 4) &= 2(x^2 - 16) \\
= 12x &= 2x^2 - 32 \\
= x^2 &= 2x^2 - 32 \\
= x^2 - 6x - 16 &= 0 \\
= (x-8)(x+2) &= 0 \\
= x &= 8
\end{aligned}$$

speed in still water = 8 km/hr

43. A man can row 18 kmph in still water. It takes him thrice as long to row up as to row down the river. Find the rate of the stream:

Answer ; 9 kmph

Basic Formula:

Speed of the stream = $\frac{1}{2} (a-b)$ km/hr

Answer with Explanation:

Let man's rate upstream 'b' = x kmph

Man's rate downstream 'a' = 3x kmph

Speed of boat in still water = $\frac{1}{2} (a+b) = 18$ kmph

$a+b = 36$ kmph

$3x + x = 36 \cdot x = 9$ kmph

$a = 27$ km/hr ; $b = 9$ km/hr

speed of the stream = $\frac{1}{2} (a-b)$

$= \frac{1}{2} (27-9)$

$= 9$ km/hr

44. A man can row at 4.5 kmph in still water. It takes him twice as long to row up as to row down the river. What is the stream?

Answer : 1.5 kmph

Basic Formula:

Rate of stream = $\frac{1}{2} (a-b)$ km/hr

Answer with Explanation:

Let speed upstream = b = x km/hr

Speed downstream = a = 2x km/hr

Speed in still water = $\frac{1}{2} (a+b) = 4.5$

$a+b = 9$

$2x + x = 9 \cdot x = 3$

$a = 6$ km/hr ; $b = 3$ km/hr

rate of stream = $\frac{1}{2} (6-3) = 1.5$ km/hr

45. A boat running down stream covers a distance of 16 kms in 2 hrs, while for the same distance upstream, it takes 4 hours. The speed of the boat in

still water:

Answer : 6 km

Basic Formula:

Speed = distance traveled/ time taken

Speed of the boat in still water = $\frac{1}{2} (a+b)$ km/hr

Answer with Explanation:

Speed downstream = $16/2 = 8$ km/hr

Speed upstream = $16/4 = 4$ km/hr

Speed of boat in still water = $\frac{1}{2} (8+4) = 6$ km/hr

Speed of the boat in still water = 6 km/hr

Part-5

Problems on boats and streams

1. If a man can swim downstream at 6 kmph and upstream at 2 kmph his speed in still water is : ans : 4 km/hr
2. A man can row upstream at 8 kmph and downstream at 12 kmph the speed of the stream is Ans: 2.5 km/hr
3. If Anshul rows 15 km upstream and 21 km downstream taking 3 hours each time, then the speed of the stream is Ans: 1 km/hr
4. A man rows 750 m in 675 seconds against the stream and returns in $7\frac{1}{2}$ minutes. How rowing speed in still water is Ans: 5 km/hr
5. A man rows 13 km upstream in 5 hours and also 28 km downstream in 5 hours. The velocity of the stream is Ans: 1.5 km/hr
6. If a boat goes 7 km upstream in 42 minutes and the speed of the stream is 3 kmph, then the speed of the boat in still water is Ans: 13 km/hr
7. A man can row $9\frac{1}{3}$ kmph in still water and finds that it takes him thrice as much time to row up than as to row down the same distance in the river. The speed of the current is ans: $4\frac{2}{3}$ km/hr
8. A man can row a boat at 10 kmph in still water. If the speed of the stream is 6 kmph, the time taken to row a distance of 80 km down the stream is ans: 5 hours
9. A boat takes 4 hours for traveling downstream from point A to point B and coming back to point A upstream. If the velocity of the stream is 2 kmph and the speed of the boat in still water is 4 kmph, what is the distance between A and B? Ans: 6 km
10. If a man rows at 6 kmph in still water and 4.5 kmph against the current, then his speed along the current is : Ans: 7.5 km/hr
11. If a man's rate with the current is 11 kmph and the rate of the current is 1.5 kmph, then the man's rate against the current is Ans: 8 km/hr
12. Speed of a boat in standing water is 9 kmph and the speed of the stream is 1.5 kmph. A man rows to a place at a distance of 10.5 km and comes back to the starting point. The total time taken by him is ans: 24 hours
13. A boat moves upstream at the rate of 1 km in 10 minutes and downstream at the rate of 1 km in 6 minutes. The speed of the current is ans: 2 km/hr

14. River is running at 2kmphr. IF takes a man twice as long to row up as to row down the river. The rate of the man in still water is ans:6km/hr
15. A man rows to a place 48km distant and back in 14 hours. He finds that he can row 4km with the stream in the same time as 3km against the stream. The rate of the stream is :ans:1km/hr
16. The current of stream runs at 1kmph. A motor baot goes 35km upstream and back again to the starting point in 12hours. The speed of the motor boat in still water is ans:6km/hr
17. A baot covers 24km upstream and 36km downstream in 6 hours while it cover 35km upstream and 24km downstream in $6\frac{1}{2}$ hours. The velocity of the current is ans:2km/hr
18. A man can row three quarters of a kilometer against the stream in $11\frac{1}{4}$ minutes and returns in $7\frac{1}{4}$ mintues. The speed of the man in still water is ans:5km/hr
19. The speed of abaot in still water is 15km/hr and the rate of current is 3 km/hr. the distance traveld downstream in 12 minutes is ans:3.6km
20. A man can row 5kmph in still water. If the river is running at 1kmph, it makes him 75minutes to row to a place and back. How far is the place? Ans:3km
21. If a man rows at the rate of 5kmph in still water and his rate against the current is 3.5kmph then the man's rate along the current is ans: 6.5km/hr

বিঃ দ্রঃ নৌকা ও শ্রোত সংক্রান্ত ৭৬ টি অংকের সমাধান করা হল। ২১ টি অংক self Test এর জন্য দেওয়া হল। মোট ৯৭

টি অংক MCQ And Written উভয় ক্ষেত্রে প্রযোজ্য।

ভালো থাকবেন এবং সবাইকে আনন্দে রাখবেন-আল্লাহ হাফেজ।

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